APOLLO 6 MISSION

HEARING

BEFORE THE

COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES UNITED STATES SENATE

NINETIETH CONGRESS

SECOND SESSION

SUMMARY OF THE PROBLEMS ENCOUNTERED IN THE SECOND FLIGHT OF THE SATURN V LAUNCH VEHICLE

APRIL 22, 1968

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SECOND FLIGHT OF SATURN V

MONDAY, APRIL 22, 1968

U.S. SENATE,
COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES,
Washington, D.C.

The committee met, pursuant to recess, at 3:30 p.m., in room 235, Old Senate Office Building, Senator Clinton P. Anderson (chairman) presiding.

Present: Senators Anderson, Stennis, Holland, Cannon, Smith, Curtis, Jordan, Brooke, and Percy.

Also present: James J. Gehrig, staff director; Everard H. Smith, Jr., Dr. Glen P. Wilson, Craig Voorhees, and William Parker, professional staff members; Sam Bouchard, assistant chief clerk; Donald H. Brennan, research assistant; and Mary Rita Robbins, clerical assistant.

The CHAIRMAN. The committee will be in order.

STATEMENTS OF JAMES E. WEBB, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; DR. GEORGE E. MUELLER, ASSOCIATE ADMINISTRATOR FOR MANNED SPACE FLIGHT; MAJ. GEN. SAMUEL C. PHILLIPS, U.S. AIR FORCE, DIRECTOR, APOLLO PROGRAM FOR MANNED SPACE FLIGHT; AND GEORGE H. HAGE, DEPUTY DIRECTOR, APOLLO PROGRAM FOR MANNED SPACE FLIGHT

Mr. WEBB. Mr. Chairman, we appreciate this opportunity to give you a summary of the problems that we have encountered in the second flight of the Saturn V, and some of the problems which we face in deciding the next steps in the program.

First of all, let me say that we started out in 1961 to build facilities on the ground, testing chambers, test stands, and many other analytical and practical experimental forms of apparatus, to learn how to correct any troubles that were encountered in this very large program.

One of the things that will come clear from the material to be presented today is the great value of this array of equipment and the capable men who know how to use it, because we have encountered some unusual problems.

I would like to take just one brief moment to say that the nature of the problems which we have encountered are in two directions. The first is with engines, and the second is with the structure as stressed by the anomalies in the engines.

MANNED TEST POSSIBLE ON NEXT FLIGHT

We believe with respect to the engines that we know how to overcome the difficulties. We believe the engines can be qualified to fly men on the next flight of the Saturn V. At least this is the recommendation of General Phillips and all of his associates.

There were about 140 people involved over this last week-end in a very careful examination of all of the data, and this meant going down into the measurements of a large number of measuring instruments, such as transducers, and an examination of a great deal of film on the basis of millisecond analysis. In other words, the recorded data was divided into very very small segments in order to make sure we understood the information that was recorded.

The CHAIRMAN. Mr. Webb, may I say—I think it would be best if we ask question as we go along.

Mr. WEBB. Absolutely, Senator.

Now, the second area of difficulty which we have encountered, and which we wanted to make sure you understood before it gets out into the press and raises some unfortunate implications, is that as the longitudinal vibrations from the engines in the first stage were transmitted upward through this 36-story tall rocket, they enlarged and built on each other, and some of the longitudinal vibrations were translated into lateral vibrations, and you had a motion something between a half inch and an inch laterally at the payload side, and there was a structural failure to the Luna Module (LM) payload level. The pictures which the airplanes which go up to photograph the rocket took, clearly show some pieces falling off of the rocket in the area of the LM, and gain, we have very great confidence that we can determine how to quiet down the vibrations and identify any structural strengthening which we will have to make.

So I wanted to leave it in your mind that there is this serious implication that could be raised that pieces were coming off of the rocket as a result of the failure of the structure up at the payload level.

With that, I would like to turn to General Phillips, if this is satisfactory, and let him give you the data.

STATEMENT BY GENERAL PHILLIPS

General PHILLIPS. Mr. Chairman, and members of the committee, on the first chart (fig. 1) I would like to remind you of the plan for the Apollo VI mission, which was the second flight of Apollo Saturn V unmanned. The viewgraph shows the plan for the mission, and if you will follow the numbers on the picture, it shows our plan to ascend into a parking orbit of 100 nautical miles, and to coast for about two orbits. And at the end of the second orbit our plan was to reignite the third stage of the launch vehicle for a translunar injection burn, to raise the apogee of the spacecraft in the upper stage of the launch vehicle to lunar distance, and subsequently, then, to turn the spacecraft around and to provide a retrovelocity by the spacecraft propulsion system of a burn of some 6 minutes' duration to lower the apogee of the spacecraft itself down to about 12,000 nautical miles, and then as the spacecraft descended, to reignite the spacecraft engine